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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/500,477	01/21/2005	Wenping Wu	10254.204-US	7706

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EXAMINER	
RAGHU, GANAPATHIRAM	
ART UNIT	**PAPER NUMBER**
1652	
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06/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/500,477	WU ET AL.	
	Examiner	Art Unit	
	Ganapathirama Raghu	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25-38* is/are pending in the application.

4a) Of the above claim(s) *35-38* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *25-34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Application Status

In response to the Office Action mailed on 12/06/2006, applicants' filed a response and amendment received on 05/07/2007. Said amendment, canceled claims 1-24 and added new claims 25-38. Thus new claims 25-38 are pending in this application. Claims 35-38 are withdrawn as they are non-elected inventions and belong to newly added group of process claims, as the original election to restriction requirement was directed to a composition comprising polypeptides (Group I, claims 14-21, letter dated 09/25/06). Newly submitted claims 35-38 are directed to an invention that is independent or distinct from the invention originally elected for the following reasons:

Inventions of claims 25-34 and Inventions of claims 35-38 are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case claims 35-38 are directed to a process of using the elected polypeptide, said polypeptide can be used in a materially different process such as an antigen for raising specific antibodies as opposed to its use in a process encompassed in claims 35-38. Accordingly, claims 35-38 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03. Furthermore, as stated in the previous Office action (12/06/2006), lack of unity was established based on the disclosure of Hong et al., and the technical features linking the inventions of Groups I-III i. e., product and process claims does not constitute a special technical feature as defined by PCT Rule 13.2, as it does not define a contribution over the prior based on

the prior art 103(a) rejection. Compositions comprising endoglucanases and a combination of other enzymes such as the combination disclosed in the instant application were well known in the art. Therefore, new claims 25-34, directed to a composition is now under consideration and for the above-cited reasons, the request for the inclusion of claims 35-38 directed to a process of using the composition are not considered and the requirement is still deemed proper and is therefore made FINAL.

Objections and rejections not reiterated from previous action are hereby withdrawn.

Withdrawn-Claim Rejections: 35 USC § 112

Rejection of claims 25-34 under 35 U.S.C. 112, second paragraph, is withdrawn following amendments to the claims.

Rejection of claims 25-27 and 29-32 under 35 U.S.C. 112, first paragraph for written description, is withdrawn following amendments a to the claims and persuasive arguments.

Maintained-Claim Rejections: 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 25-34 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a composition comprising an endoglucanase consisting of amino acid residues 1-305 of SEQ ID NO: 2 or to the mature polypeptide amino acid residues 1-303 with SEQ ID NO: 18 and encoded by a polynucleotide comprising nucleotides 91-1008 of SEQ ID NO: 1 or nucleotides 97-1008 of SEQ ID NO: 17 of the instant application and a xylanase comprising the amino acid residues 1-195 of SEQ ID NO: 14, does not reasonably provide

enablement for any composition comprising the elected thermostable enzymes having endoglucanase and xylanase activities, wherein said endoglucanase is encoded by a polynucleotide which hybridizes under medium stringency conditions (as defined in the specification, lines 6-11, page 20) to a polynucleotide comprising nucleotides 91-1008 of SEQ ID NO: 1 or nucleotides 97-1008 of SEQ ID NO: 17 and encoding for a polypeptide having endoglucanase activity from any source including recombinants, variants and mutants and a xylanase of family 10 glycoside hydrolase. The hybridization conditions are of medium stringency (high salt and medium temperature wash) and this will allow many heterogeneous population of nucleic acid molecules, i. e., heteroduplexes including many mutants, variants and recombinants of said polynucleotides to hybridize to target molecule comprising nucleotide residues 97-1008 of SEQ ID NO: 17 at said stringent conditions (see Molecular Cloning A laboratory Manual, second Edition, 1989, Cold Spring Harbor Laboratory Press, Ed. Sambrook J, Fritsch EF and Maniatis T). The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and or use the invention commensurate in scope with the claims.

Factors to be considered in determining whether undue experimentation is required are summarized in *In re Wands* (858 F.2d 731, 8 USPQ 2nd 1400 (Fed. Cir. 1988)) as follows: (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claim(s).

Claims 25-34 are so broad as to encompass for any composition comprising the elected thermostable enzymes having endoglucanase and xylanase activities, wherein said endoglucanase is encoded by a polynucleotide which hybridizes under medium stringency conditions (as defined in the specification, lines 6-11, page 20) to a polynucleotide comprising nucleotides 91-1008 of SEQ ID NO: 1 or nucleotides 97-1008 of SEQ ID NO: 17 and encoding for a polypeptide having endoglucanase activity from any source including recombinants, variants and mutants and a xylanase of family 10 glycoside hydrolase. The hybridization conditions are of medium stringency (high salt and medium temperature wash) and this will allow many heterogeneous population of nucleic acid molecules, i. e., heteroduplexes including many mutants, variants and recombinants of said polynucleotides to hybridize to target molecule comprising nucleotides 91-1008 of SEQ ID NO: 1 or nucleotides 97-1008 of SEQ ID NO: 17 at said stringent conditions. The scope of the claims are not commensurate with the enablement provided by the disclosure with regard to the extremely large number of polypeptides and encoding polynucleotides broadly encompassed by the claims. Since the amino acid sequence of a protein encoded by a polynucleotide determines its structural and functional properties, predictability of which changes can be tolerated in a protein's amino acid sequence and obtain the desired activity requires knowledge and guidance with regard to which amino acids in the protein's sequence and the respective codons in its polynucleotide, if any, are tolerant of modification and which are conserved (i.e. expectedly intolerant to modification), and detailed knowledge of the ways in which the encoded proteins' structure relates to its function. However, in this case the disclosure is limited to a composition comprising an endoglucanase consisting of amino acid residues 1-305 of SEQ ID NO: 2 or to the mature polypeptide amino acid residues 1-

303 with SEQ ID NO: 18 and encoded by a polynucleotide comprising nucleotides 91-1008 of SEQ ID NO: 1 or nucleotides 97-1008 of SEQ ID NO: 17 of the instant application and a xylanase comprising the amino acid residues 1-195 of SEQ ID NO: 14, but provides no guidance with regard to the making of variants and mutants or with regard to other uses. In view of the great breadth of the claims, amount of experimentation required to make the claimed polypeptides and encoding polynucleotides, the lack of guidance, working examples, and unpredictability of the art in predicting function from a polypeptide primary structure (e.g., see Ngo et al. in The Protein Folding Problem and Tertiary Structure Prediction, 1994, Merz et al. (ed.), Birkhauser, Boston, MA, pp. 433 and 492-495), the claimed invention would require undue experimentation. As such, the specification fails to teach one of ordinary skill how to use the full scope of the polypeptides encompassed by this claim.

While enzyme isolation techniques, recombinant and mutagenesis techniques are known, and it is not routine in the art to screen for multiple substitutions or multiple modifications as encompassed by the instant claim, the specific amino acid positions within a protein's sequence where amino acid modifications can be made with a reasonable expectation of success in obtaining the desired activity/utility are limited in any protein and the result of such modifications is unpredictable. In addition, one skilled in the art would expect any tolerance to modification for a given protein to diminish with each further and additional modification, e.g. multiple substitutions or deletions.

The specification does not support the broad scope of the claims which encompass all modifications to the elected thermostable enzymes having endoglucanase and xylanase activities, i. e., any composition comprising the elected thermostable enzymes having endoglucanase and

xylanase activities, wherein said endoglucanase is encoded by a polynucleotide which hybridizes under medium stringency conditions (as defined in the specification, lines 6-11, page 20) to a polynucleotide comprising nucleotides 91-1008 of SEQ ID NO: 1 or nucleotides 97-1008 of SEQ ID NO: 17 and encoding for a polypeptide having endoglucanase activity from any source including recombinants, variants and mutants and a xylanase of family 10 glycoside hydrolase. The hybridization conditions are of medium stringency (high salt and medium temperature wash) and this will allow many heterogeneous population of nucleic acid molecules, i. e., heteroduplexes including many mutants, variants and recombinants of said polynucleotides to hybridize to target molecule comprising nucleotides 91-1008 of SEQ ID NO: 1 or nucleotides 97-1008 of SEQ ID NO: 17 at said stringent conditions, because the specification does not establish: (A) regions of the protein/polynucleotide structure which may be modified without affecting the activity of encoded endoglucanase polypeptide; (B) the general tolerance of the polypeptide and the polynucleotide encoding endoglucanase polypeptide to modification and extent of such tolerance; (C) a rational and predictable scheme for modifying any amino acid residue or the respective codon in the polynucleotide with an expectation of obtaining the desired biological function i.e., endoglucanase activity; and (D) the specification provides insufficient guidance as to which of the essentially infinite possible choices is likely to be successful.

Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make and use the claimed invention in a manner reasonably correlated with the scope of the claim broadly including endoglucanases with an enormous number of modifications. The scope of the claim must bear a reasonable correlation with the scope of enablement (*In re Fisher*, 166 USPQ 19 24 (CCPA 1970)). Without sufficient guidance, determination of polypeptides and

encoding polynucleotides of endoglucanase having the desired biological characteristics is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue. See *In re Wands* 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988).

Applicants' have traversed this rejection and the claimed invention is enabled and any person skilled in the art can make and use the invention without undue experimentation and Office must provide evidence or reasoning for substantiating the doubts so expressed. Applicants' arguments have been considered and found to be non-persuasive due to the reasons stated in the rejection above.

The specification does not support the broad scope of the claims which encompass an enzyme composition comprising polypeptides encoded by polynucleotide sequences other than an isolated polynucleotide sequence comprising nucleotides 91-1008 of SEQ ID NO: 1 or nucleotides 97-1008 of SEQ ID NO: 17 encoding a polypeptide amino acid residues 1-305 of SEQ ID NO: 2 or to the mature polypeptide amino acid residues 1-303 with SEQ ID NO: 18. The hybridization conditions are of medium stringency to encompass sequences having substantial variations in sequence from SEQ ID NOs: 1 and 17 as under the conditions described (as defined in the specification, lines 6-11, page 20) in the claims. Other sequences that are not full complement or heterogeneous sequences of lower than 95% homology to SEQ ID Nos.: 1 and 17 will also hybridize. Thus, applicants have not provided sufficient guidance to enable one of ordinary skill in the art to make and use the claimed invention in a manner reasonably correlated with the scope of the claims broadly including polypeptides encoded by polynucleotides with an enormous number of modifications that can potentially hybridize to

nucleotide sequences of SEQ ID NOs: 1 and 17 under said hybridization conditions. The scope of the claim must bear a reasonable correlation with the scope of enablement (*In re Fisher*, 166 USPQ 19 24 (CCPA 1970)). Without sufficient guidance, determination of polypeptides and encoding polynucleotides of endoglucanase having the desired biological characteristics is unpredictable and the experimentation left to those skilled in the art is unnecessarily, and improperly, extensive and undue. See *In re Wands* 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988).

Maintained-Claim Rejections: 35 USC § 103

Amendments, addition of new claims with new limitations has necessitated presentation of new references for the obviousness rejection.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 25-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mullertz et al., (US Patent No.: 6,264,946 B1, 2001) or Fagerstrom et al., (US Patent No.: 5,922,579, 1999) or Paloheimo et al., (US Patent No.: 6,228,629 B1, 2001) and in view of Hong et al., (PUBMED, Gene Accession No.: AY055121, publication date 23 Oct. 2001) and Gupta et al., (Appl. Environ. Microbiol., 200, Vol. 66(6): 2631-2635). Mullertz et al., (Column 4, lines 45-64, Feed enhancing enzymes) or Fagerstrom et al., (Column 8, line 18-56) or Paloheimo et al., (Column 1, lines 10-36) teach xylanase enzyme compositions in combination with other enzymes including endoglucanase and the use of such compositions in various applications including as a feed additive. Mullertz et al., or Fagerstrom et al., or Paloheimo et al., do not specifically teach compositions comprising thermostable enzymes having endoglucanase and xylanase activities, wherein said endoglucanase has an amino acid sequence of at least 95% identity to amino acid residues 1-305 of SEQ ID NO: 2 or to the mature polypeptide amino acid residues 1-303 with SEQ ID NO: 18 or is encoded by a polynucleotide which hybridizes under medium stringency conditions to a polynucleotide comprising nucleotides 91-1008 of SEQ ID NO: 1 or nucleotides 97-1008 of SEQ ID NO: 17 and a xylanase belonging to the family of 10 glycoside hydrolase. Hong et al., (*supra*) disclose a polynucleotide sequence with 99% sequence homology to SEQ ID NO: 1 and 17 and encoding a polypeptide with endoglucanase activity that has 100% sequence homology to SEQ ID NO: 2 and 18 (see NCBI sequence information and annotation provided). Gupta et al., (*supra*) disclose a polynucleotide sequence encoding a thermostable alkalophilic endoxylanase belonging to the family of 10 glycoside hydrolase. It would have been obvious to a person of ordinary skill in the art to combine the teachings of Mullertz et al., or Fagerstrom et al., or Paloheimo et al., and Hong et al., and Gupta et al, to produce a composition comprising at

least one thermostable polypeptide having xylanase activity belonging to family 10 glycoside hydrolase and at least one thermostable polypeptide having endoglucanase activity. Motivation to do so derives from the fact that the compositions comprising xylanase and endoglucanase are known feed enhancing enzymes, when added to animal feed they improve the in vivo breakdown of plant cell wall material whereby a better utilization of the plant nutrients by the animal is achieved. In this way the growth rate and/or feed conversion ratio of the animal becomes improved. The expectation of success is high, because feed enhancing enzymes were well known in the art and Mullertz et al., or Fagerstrom et al., or Paloheimo et al., teach the preparation and use of compositions comprising various enzymes including endoglucanase and xylanase and their use as feed additives and Hong et al., and Gupta et al, cited above teach the isolation of two thermostable enzymes endoglucanase and xylanase respectively including the method of making the polypeptide. Therefore, claims 25-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mullertz et al., (US Patent No.: 6,264,946 B1, 2001) or Fagerstrom et al., (US Patent No.: 5,922,579, 1999) or Paloheimo et al., (US Patent No.: 6,228,629 B1, 2001) and in view of Hong et al., (PUBMED, Gene Accession No.: AY055121, publication date 23 Oct. 2001) and Gupta et al., (Appl. Environ. Microbiol., 200, Vol. 66(6): 2631-2635).

Applicants'. have traversed the above rejection with the amendments to claims and claiming applicants' invention composition comprises at least one thermostable polypeptide having xylanase activity belonging to family 10 glycoside hydrolase and not the family 11 hydrolase as taught by the prior art references. Applicants arguments have been considered but are found to be non-persuasive as xylanases belonging to family 10 glycoside hydrolase were also well known in the art and any person of ordinary skill in the art would be motivated to

modify the composition of feed enhancing enzymes as taught by Mullertz et al., or Fagerstrom et al., or Paloheimo et al., with the xylanase belonging to family 10 glycoside hydrolase as taught by Gupta et al, as this provides yet another combination of feed enhancing enzymes with a different spectrum of substrate specificity and enzyme activity already known in the art.

Summary of Pending Issues

The following is a summary of issues pending in the instant application.

1) Claims 35-38 are withdrawn as they are directed to non-elected inventions.

2) Claims 25-34 are rejected under 35 U.S.C. 112, first paragraph, for enablement.

3) Claims 25-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mullertz et al., (US Patent No.: 6,264,946 B1, 2001) or Fagerstrom et al., (US Patent No.: 5,922,579, 1999) or Paloheimo et al., (US Patent No.: 6,228,629 B1, 2001) and in view of Hong et al., (PUBMED, Gene Accession No.: AY055121, publication date 23 Oct. 2001) and Gupta et al., (Appl. Environ. Microbiol., 200, Vol. 66(6): 2631-2635).

Conclusion

None of the claims are allowable. Claims 25-34 are rejected for the reasons identified in the Rejections and Summary sections of this Office Action. Applicants must respond to the objections/rejections in each of the sections in this Office Action to be fully responsive for prosecution.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Final Comments

To insure that each document is properly filed in the electronic file wrapper, it is requested that each of amendments to the specification, amendments to the claims, Applicants' remarks, requests for extension of time, and any other distinct papers be submitted on separate pages.

It is also requested that Applicants identify support, within the original application, for any amendments to the claims and specification.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ganapathirama Raghu whose telephone number is 571-272-4533. The examiner can normally be reached between 8 am-4:30 pm EST. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathapu Achutamurthy can be reached on 571-272-0928. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300 for regular communications and for After Final communications. Any inquiry of a general nature or relating to the status of the application or proceeding should be directed to the receptionist whose telephone number is 571-272-1600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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